

## EXECUTIVE SUMMARY

A Committee of representatives from State and Federal agencies and State universities was formed in 1988 to gather information on natural resources of the lower Roanoke River watershed in North Carolina and to recommend a water flow regime that would be mutually beneficial to the resources and their users. A modified, trial flow regime was judged acceptable by the US Army Corps of Engineers and Virginia Power Company. The Committee suggested that the flow regime be evaluated over a four-year period (1989-1992), and that a report be issued each year during the study period. The trial period was extended to include 1993 by the US Army Corps of Engineers at the request of the North Carolina Wildlife Resources Commission.

The purpose of this Flow Report is to document hydrological events and reservoir operations for 1991-1993 in context with field research efforts and observations in the lower Roanoke River Basin on a number of watershed resources: fisheries (especially striped bass), wildlife, agriculture, and timber. This report differs from the three previous reports issued by the Flow Committee (Manooch and Rulifson 1989, Rulifson and Manooch 1990a, Rulifson and Manooch 1991) because it contains sections pertaining to abundance and habitat use of overwintering songbird and woodpecker communities, aquatic macroinvertebrate ecology and management relative to hydrology, public lands, heavy metal contaminants, Roanoke River time travel studies, relative abundance of finfish species other than striped bass, and susceptibility of larval fishes to entrainment by water withdrawal pipes. Following are summaries of the major sections contained herein. Each summary is presented as a separate paragraph.

**FLOODPLAIN ECOLOGY.** The lower Roanoke River floodplain is considered to be the largest intact, and least disturbed, bottomland forest ecosystem remaining in the Mid-Atlantic Region of the United States. The floodplain and adjacent uplands support at least 20 distinct natural communities, which contain a diverse assemblage of plants and animals. The floodplain has enormous biological significance and provides habitat for two federally-listed endangered animals, 15 state-listed animals, 13 state-listed plants, and a number of other rare species of flora and fauna.

**FOREST RESOURCES.** The forest vegetation types, prior to 1950, occurred as a function of natural variances associated with the River's hydrobiological regime. Floodplain species sorted themselves along a naturally occurring continuum of soil anaerobiosis (water-logging). Because forested bottomlands of the Roanoke River are transitional in nature between the upland and aquatic zones, the complex and distinct layering forced by the hydrologic gradient (preimpoundment) provided many niches and habitats for a variety of wetland species, some of which are strictly limited to a wetland environment. Flood duration, frequency, and depth affected the vegetative communities which, in turn, affected animal community dynamics. The preimpoundment water regime was the most characteristic signature of the Roanoke River bottoms, and the alteration of that hydrology would likely have impaired some ecosystem functions. The asynchronous flows associated with an impounded river must disturb the hydrological, soil, physical, chemical, and biological properties of the bottomland system, eventually leading to a functional change. The consequences of altered hydroperiod in Roanoke bottomlands can be assumed to have long-term effects on existing vegetation and on regeneration of forest lands following harvest.

**WATER QUALITY CONDITIONS.** The North Carolina Division of Environmental Management (DEM) Water Quality Section maintains an extensive database containing water quality information for all waters of the State. Classifications and associated standards are assigned to waters based on their best usage. Ratings also are assigned to waterbodies to reflect the ability of the given waterbody to support its designated uses. Of the 2,414 Roanoke stream